

TR NEWS

May-June 2020

NUMBER 327

Tunnels

**SAFETY AND TECHNOLOGY ADVANCES
IN THE UNITED STATES AND BEYOND**

100 YEARS MOVING IDEAS:
ADVANCING SOCIETY

The National Academies of
SCIENCES • ENGINEERING • MEDICINE



TRANSPORTATION RESEARCH BOARD

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* Membership as of May 2020.

3 Tunnels: Safety and Technology Advances in the United States and Beyond

Steve Ernst and Jeff Western

This *TR News* theme issue explores tunnels, a crucial—and often underappreciated—link in the transportation network. By opening routes through urban areas and reducing travel time in mountainous regions, tunnels provide access and offer connections that have significant effects on communities and the economy. Examined are the operations, design, safety measures, and technologies for efficient and safe tunnels in the United States and abroad.

5 Role of Tunnel Organizations

6 Jacks of All Trades, Masters of Everything: Eisenhower–Johnson Memorial Tunnel Operators

Stephen Harelson

The Eisenhower–Johnson Memorial Tunnel (EJMT) in the remote Colorado mountains faces all the challenges of the average tunnel—and then some. Nearly 15 miles from the nearest town and spending much of the winter under more than 20 feet of snow, EJMT relies on the persistent work of its tunnel operators to ensure the safe movement of vehicles. This article recounts examples of the adaptability, resourcefulness, and resilience of EJMT workers.

9 National Tunnel Inventory Guidelines and Standards

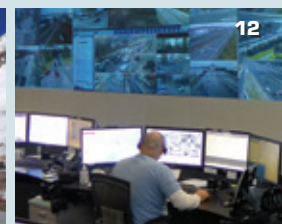
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12 Fixed Firefighting Systems in Australia and New Zealand: Results from the FHWA Global Benchmarking Program

Matt Bilson and Steve Ernst

Many tunnel owners and operators are deploying fixed firefighting systems (FFFS) to control fires inside the tunnel more effectively than by emergency ventilation and egress alone, improving the environment for evacuation, rescue, and firefighting. This article addresses an international study of the FHWA Global Benchmarking Program to learn from countries that have successfully deployed FFFS in highway tunnels.



17 Safety in Highway Tunnel Operations

Gary English

Research, advanced engineering, the involvement of emergency responders, and an emphasis on an integrated safety approach have led to vast improvements in safety in newly commissioned U.S. tunnels. In this article, the author identifies potential safety gaps and improvements to design, operations, and fire life safety systems.

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25 Fixed Firefighting Systems and Self-Evacuation: Influence on User Behavior in Road Tunnels

Ingo Kaundinya and Anne Lehan

This overview of research conducted at Germany's Federal Highway Research Institute examines the influence of FFFS on human behavior in an emergency evacuation in road tunnels and how these systems interact with existing tunnel safety equipment.

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Jürgen Krieger and Ingo Kaundinya



COVER Fixed firefighting systems and other safety advancements in road tunnels are addressed in this issue of *TR News*. (Photo: FHWA)

31 Economic Importance of Seattle's Alaskan Way Highway Tunnel

Bijan Khaleghi

In 2009, earthquake damage led Washington State officials to replace the Alaskan Highway Viaduct—then nearly 50 years old—with a bored tunnel. This article tracks the project's beginnings, process, and future as a key component to the redesign of Seattle's central waterfront.

33 RESEARCH PAYS OFF Shedding Light on Tunnels: Proposed Guidelines for Emergency Exit Signs and Marking Systems for Highway Tunnels

Louis J. Ruzzi and Laura Higgins

36 POINT OF VIEW International Perspective on Fire Safety in Tunnel Design, Operation, and Management

Conrad Stacey

The author examines opportunities for risk control in road tunnel design and operation, with lessons taken from agencies and tunnel owners all over the world—from the United States to Australia and New Zealand to Japan. The article also focuses on details and code compliance that can mask fundamental drivers of risk in tunnels.

TRB COVID-19 Resources

Agencies and organizations can use TRB publications and online resources for useful and timely information to help address issues related to the novel coronavirus pandemic. To read about TRB's current research and activities and for a list of relevant publications, visit www.nationalacademies.org/trb/blog/transportation-in-the-face-of-communicable-disease.

Coming Next Issue

The July–August 2020 issue of *TR News* is dedicated to water and the role of transportation agencies in the stewardship of this vital resource, particularly as the way humans use water is changing dramatically. Authors will explore the evolution of stormwater regulation; how departments of transportation manage water in planning, design, construction, and operations; and more.

Alabama DOT's novel approach to construction stormwater management involves five pillars—from communications to sediment control—and has been successfully implemented in project planning and design, during construction, and while troubleshooting ongoing projects.



Photo courtesy Barry Fagan

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TR NEWS

features articles on innovative and timely research and development activities in all modes of transportation. Brief news items of interest to the transportation community are also included, along with profiles of transportation professionals, meeting announcements, summaries of new publications, and news of Transportation Research Board activities.

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